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"To sum up the whole matter in a single sentence : It is held that bird migration is a habit evolved by education and inheritance which owe their origin and perpetuation to winter with its failure of food."

W. E. R.

Ovogenesis in Tunicates.—Dr. F. W. Bancroft has published (*Bulletin of the Mus. of Comp. Zoöl.*, Vol. XXXV, No. 4, 1899) an extended account of his studies on the ovogenesis of *Distaplia occidentalis*.

In general, the development of the gonads and their ducts resembles that found in *Perephora*, *Clavelina*, and *Ciona*.

The most significant difference consists in the fact that the fundamen-
t of the ovotestis is present in the youngest stages in *Distaplia*, whereas in the other species it appears quite late in ontogeny.

To the question which type of ovary is more primitive, that represented by *Clavelina*, where there are two separate germinative epithelia, or that found in *Distaplia* with but a single such epithelium, the author is inclined to give the distinction to the *Distaplia* type, since here it occurs in a smaller and simpler species, and is itself simpler.

Dr. Bancroft goes at length into the question of the origin and fate of the test cells, discussing the whole matter in the light of the more recent statements by Davidoff and Salensky, based on their observations on *Distaplia magnilarva*. He does not confirm the results of these authors, and as his studies pertained to a species very closely related to the one studied by them; and, furthermore, as he had the opportunity, through the great courtesy of Professor Salensky, to examine slides of *D. magnilarva*, it would seem that his critical findings should be conclusive on this much discussed problem.

The function of these cells, the author believes, is to furnish nutriment to the growing ovum. He concludes that they are particularly active in this capacity in the early stages of the growth of the ovum, while the nucleus exerts its principal activity in the later stages in converting this nutritive material into yolk.

The germinative vesicle diminishes in size gradually and continuously with the increase in quantity of yolk in the ovum.

W. E. R.

Reproduction of Amœba.—In addition to the common and recurring bipartite division of *Amœba proteus*, Scheel¹ has described a

¹ Scheel, C. Beiträge zur Fortpflanzung der Amœben, *Festschrift zum siebenzigsten Geburtstag von Carl von Kupffer*, pp. 569–580, Pl. LI. Jena, 1899.

method of sporulation, or multiple reproduction, which takes place within a cyst formed by the animal itself. This cyst is thick-walled, spherical, and transparent, and, although without stalk or adhesive organ of any sort, it regularly sticks fast to small objects in the water, being found singly or in groups on sticks or stones. The series of changes were not observed in full, but the nucleus of the amœba is reduced by a series of direct divisions into a large number of daughter-nuclei. When this number has reached some five or six hundred the body of the amœba divides into as many independent daughter-individuals, and these are set free by the gradual decay and bursting of the cyst wall. A flagellate stage does not occur in *Amœba proteus*, but the spores enter directly upon the amœboid condition.

The causes of the multiple division in the encysted condition were not determined. The process is not related to sexual reproduction and apparently does not occur at regular intervals. Experiments by starvation, excess of food, evaporation of the water, and by transferring the animals to water from other localities, *i.e.*, by changed conditions of existence to bring the amœbas to encystment and sporulation, were uniformly without success. H. B. W.

Arctic Deep-Sea Fauna. — One of the most important results of recent Arctic exploration is the discovery of a true deep-sea fauna. An address delivered recently to the German Zoölogical Society by Dr. Schaudinn,¹ on the expedition made in 1898 by Drs. F. Schaudinn and F. Roemer to Spitzbergen, contains a preliminary report on this fauna.

This expedition set out to make collections in the Spitzbergen Sea, and successfully tried to reach the deep Arctic basin discovered by Nansen. This deep, called by Schaudinn the "Nansen Rinne," was reached north of Spitzbergen in $81^{\circ} 32'$, and a number of deep-sea dredgings were made. A true deep-sea fauna was discovered entirely different from the Arctic fauna of the shallow sea surrounding Spitzbergen (and from the other Arctic faunas hitherto known). Its most striking feature is the presence of an abundance of Hexactinellid sponges, a group never found previously in the Arctic regions, all of them belonging to new genera. These sponges are so plentiful that their remains form a very characteristic deposit on the bottom, composed of the spicules of the dead sponges closely connected and densely interwoven, so as to form a fine network, the meshes of

¹ Schaudinn, F. *Verh. Deutsch. Zool. Gesellsch.* (1899), pp. 227 ff.